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EXAMINER	
KIM, RICHARD H	
ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/782,517	Applicant(s) SCALORA ET AL.	
	Examiner Richard H Kim	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-39 is/are pending in the application.

4a) Of the above claim(s) 31-39 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9,11-13 and 16-30 is/are rejected.

7)☒ Claim(s) 10,14 and 15 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 8, 9, 11-13, 18-23, 25-27, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara et al. (US 5,844,649) in view of Taga et al. (US 4,507,547).

Referring to claims 1 and 17, Yamahara et al. discloses an LCD device comprising a first and second spaced transparent electrodes being constructed and arranged to have a voltage applied across the first and second transparent electrodes (10, 13, 16), a liquid crystal layer positioned between the first and second transparent electrodes for selectively displaying the image in response to the voltage applied across the first and second electrodes (8). However, the reference does not disclose that the first and second electrodes include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum.

Taga et al. discloses a device comprising an electrode (col. 7, line 58) including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum since one would be motivated to provide a heat shielding layered structure to shield against heat waves, especially against infrared rays, without impairing the transparency to visible light (col. 1, lines 6-13).

Referring to claims 2 and 3, Yamahara et al. and Taga et al. disclose the device previously recited. However, Yamahara et al. does not disclose a first metal layer having a first metal thickness; a first interstitial layer having a first interstitial thickness formed on the first metal layer; a second metal layer having a second metal thickness formed on the first interstitial layer; a second interstitial layer having a second interstitial thickness formed on the second metal layer; and a third metal layer having a third metal thickness formed on the second interstitial layer; and a third interstitial layer having a third interstitial thickness formed on the third metal layer; and a transparent substrate to support the first metal layer, wherein an arrangement of the metal and interstitial layers exhibits the photonic band gap structure.

Taga et al. discloses a first metal layer having a first metal thickness (30); a first interstitial layer having a first interstitial thickness formed on the first metal layer (21); a second metal layer having a second metal thickness formed on the first interstitial layer (30); a second interstitial layer having a second interstitial thickness formed on the second metal layer (22); and a third metal layer having a third metal thickness formed on the second interstitial layer (30), and a third interstitial layer having a third interstitial thickness formed on the third metal layer (23);

and a transparent substrate to support the first metal layer (10), wherein an arrangement of the metal and interstitial layers exhibits the photonic band gap structure (Fig. 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a first metal layer having a first metal thickness; a first interstitial layer having a first interstitial thickness formed on the first metal layer; a second metal layer having a second metal thickness formed on the first interstitial layer; a second interstitial layer having a second interstitial thickness formed on the second metal layer; and a third metal layer having a third metal thickness formed on the second interstitial layer, and a third interstitial layer having a third interstitial thickness formed on the third metal layer; and a transparent substrate to support the first metal layer wherein an arrangement of the metal and interstitial layers exhibits the photonic band gap structure since one would be motivated to provide a heat shielding layered structure to shield against heat waves, especially against infrared rays, without impairing the transparency to visible light (col. 1, lines 6-13).

Referring to claim 8, Yamahara et al. and Taga et al. disclose the device previously recited. However, Yamahara et al. does not disclose that the first and second interstitial layers are selected from a group comprising semiconductor materials, ordinary dielectrics, and a combination of semiconductor and dielectric materials.

Taga et al. discloses that the first and second interstitial layers are selected from a group comprising semiconductor materials, ordinary dielectrics, and a combination of semiconductor and dielectric materials (Fig. 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first and second interstitial layers to be selected from a group

comprising semiconductor materials, ordinary dielectrics, and a combination of semiconductor and dielectric materials since one would be motivated to provide a heat shielding layered structure to shield against heat waves, especially against infrared rays, without impairing the transparency to visible light (col. 1, lines 6-13).

Referring to claim 9, Yamahara et al. and Taga et al. disclose the device previously recited. However, the references do not disclose that the first and second interstitial layers comprise Magnesium Fluoride.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first and second interstitial layer to comprise Magnesium Fluoride since Magnesium Fluoride is well known in the art to be used as a dielectric in thin film filters.

Referring to claims 11 and 13, Yamahara et al. and Taga et al. disclose the device previously recited. However, Yamahara et al. does not disclose that the non-visible wavelength range comprises the infrared (IR) region of the electromagnetic spectrum.

Taga et al. discloses that the non-visible wavelength range comprises the infrared (IR) region of the electromagnetic spectrum (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the non-visible wavelength range to comprise the infrared (IR) region of the electromagnetic spectrum since one would be motivated to provide a heat shielding layered structure to shield against heat waves, especially against infrared rays, without impairing the transparency to visible light (col. 1, lines 6-13).

Referring to claim 12, Yamahara et al. and Taga et al. disclose the device previously recited. However, Yamahara et al. disclose does not disclose that the non-visible wavelength range comprises the ultraviolet (UV) region of the electromagnetic spectrum.

Taga et al. discloses that the non-visible wavelength range comprises the ultraviolet (UV) region of the electromagnetic spectrum (col. 12, lines 60-63).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the non-visible wavelength range to comprise the ultraviolet (UV) region of the electromagnetic spectrum since one would be motivated to "give it a pleasing color" (col. 12, lines 63-64).

Referring to claim 16, Yamahara et al. and Taga et al. disclose the device previously recited. Yamahara et al. further discloses first and second signal lines, respectively connected to the first and second electrodes, for applying voltage across the first and second electrode across the first and second electrodes (col. 3, lines 48-56). The motivation for providing alternating metal layer of a transparent metal stack is given above.

Referring to claim 18, Yamahara et al. disclose the device further comprising a first and second LC aligning layers, respectively positioned adjacent the first and second transparent electrodes and in contact with the LC layer, for aligning LCD molecules in the LCD layer in predetermined directions (see Fig. 1, ref. 11, 14), a first transparent substrate for supporting the first transparent electrode (see Fig. 1, ref. 12); a second transparent substrate and a color filter for supporting the second transparent substrate (see Fig. 23, ref. 9 and 73); and first and second polarizing filter respectively overlaying the outer surface of the first and second transparent substrates (see Fig. 1, ref. 4, 5).

Referring to claims 19-23, Yamahara et al. discloses the device previously recited. Yamahara et al. further discloses that a Twisted Nematic LCD device, wherein an orientation of LC molecules in the LC layer twists or rotates through an angle of 90 degrees across the LC layer, and an LCD device wherein the LCD device is STN (see col. 13, lines 34-43). However, the reference does not disclose that the device is DSTN, Triple Super Twisted Nematic or is a Film Compensated Super Twisted Nematic LCD device, wherein a plastic film is used as a compensator.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a device that is DSTN, Triple Super Twisted Nematic or is a Film Compensated Super Twisted Nematic LCD device, wherein a plastic film is used as a compensator since applicant has claimed numerous LCD modes and is therefore not a critical feature of the invention. As a result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used any desirable mode for the LCD device.

Referring to claims 25 and 27, Yamahara et al. discloses a transparent substrate (see Fig. 1, ref. 12); a matrix of transparent pixel electrodes formed on the transparent substrate (see Fig. 1, ref. 13); a switching device associated with each pixel electrode and being constructed and arranged to selectively apply a first voltage to the pixel electrode (see col. 13, lines 44-47; Fig. 1, ref. 16); a transparent common electrode layer spaced apart from the matrix of pixel electrodes and being constructed and arranged to have a second voltage applied thereto (see Fig. 1, ref. 10); and a liquid crystal layer positioned between the common electrode layer and the matrix of the pixel electrodes to form a corresponding matrix of LC image pixel (see Fig. 1, ref. 8), whereby each image pixel in the matrix of image pixels selectively transmits light in response to voltage

applied across the image pixel by the common electrode and an associated pixel electrode to form an image on the display (see col. 14, lines 16-34). However, the reference does not disclose a device comprising transparent pixel electrodes and the common electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum.

Taga et al. discloses a device including a transparent metal stack having a layered structure including alternating metal and interstitial layer formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a transparent pixel electrodes and the common electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum since one would be motivated to provide a heat shielding layered structure to shield against heat waves, especially against infrared rays, without impairing the transparency to visible light (col. 1, lines 6-13).

Referring to claim 26, Yamahara et al. discloses a device comprising a plurality of scanning lines formed in a first direction on the substrate; and a plurality of data lines formed in a second direction on the substrate such that the scanning lines and the data lines cross-over each

other, and wherein each switching device is formed at a cross-over portion between one of the scanning lines and one of the data lines, the switching device including first and second control inputs connected respectively to the one of the data lines and one of the scanning lines, and an output connected to the pixel electrode for selectively applying a voltage to the pixel electrode in response to voltage signals on the one of the scanning lines (col. 14, lines 17-34).

Referring to claims 29 and 30, Yamahara et al. discloses a device and method comprising a plurality of transparent first electrodes supported by a first substrate and extending in a first direction, the first electrode being constructed and arranged to have a first voltage applied to selected ones of the first electrodes; a plurality of transparent second electrodes supported.by a second substrate and spaced apart from the first electrodes, the second electrodes extending in a second direction to cross-over the row electrodes being constructed and arrange to have a second voltage applied to selected ones of the second electrodes (see col.14, lines 8-34); and a liquid crystal layer positioned between the first and second electrodes and forming a matrix of LC pixel regions corresponding to the cross over positions between the first and second electrodes, wherein each of the LC pixel regions selectively transmits light in response to a voltage applied across the pixel regions resulting form the first and second voltages, to thereby from an image (see col. 14, lines 8-34; Fig. 17, ref. 55). However, the reference does not disclose that each of the first electrodes include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum.

Taga et al. discloses that each of the first electrodes include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum since one would be motivated to provide a heat shielding layered structure to shield against heat waves, especially against infrared rays, without impairing the transparency to visible light (col. 1, lines 6-13)

3. Claims 4-7, 24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara et al. and Taga et al., in view of Guiselin (US 5,95,825).

Referring to claims 4-6, 24 and 28, Yamahara et al. and Taga et al. disclose the device previously recited. However, the reference does not disclose that the first, second and third metal layers are silver, and wherein the first transparent electrode has a conductivity of at least two order of magnitude greater than a conductivity of ITO.

Guiselin discloses that the first, second and third metal layer are silver (col. 2, lines 41-47).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first, second and third metal layers to be silver since silver is

preferable for its infrared reflection properties (col. 2, lines 41-43). Furthermore, since Guiselin meets the structural limitations, it would follow that the transparent electrode would further have a conductivity of at least two order of magnitude great than a conductivity of ITO.

Referring to claim 7, Yamahara et al. and Taga et al. disclose the device previously recited. However, the references do not disclose that the first, second and third metal thickness are each between approximately 2.5 to 5 nanometers and approximately 40 to 60 nanometers.

Guiselin discloses that the first, second and third metal thickness are each between approximately 2.5 to 5 nanometers and approximately 40 to 60 nanometers (col. 4, lines 1-6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first, second and third metal thickness to be each between approximately 2.5 to 5 nanometers and approximately 40 to 60 nanometers since such limitations are a result effective variable. The infrared reflection properties are determined in part by the thickness of the metal layers (col. 3, lines 16-25). Therefore, determining the thickness of the layers to provide optimum infrared reflection properties would have been obvious.

Allowable Subject Matter

4. Claims 10, 14 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard H Kim whose telephone number is (571)272-2294. The examiner can normally be reached on 9:00-6:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (571)272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard H Kim
Examiner
Art Unit 2871

RHK

TARIFUR R. CHOWDHURY
PRIMARY EXAMINER